

April 28, 2016

**VIA IBFS**

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12<sup>th</sup> Street SW  
Washington, D.C. 20554

*Re: Iridium Constellation LLC; Application for Modification of Non-Geostationary Mobile Satellite Service System Authorization (S2110) To Launch and Operate Replacement Satellites; Call Sign S2110; File No. SAT-MOD-20131227-00148;*

Dear Ms. Dortch:

Iridium Constellation LLC (“Iridium”) wishes to place in the record an updated assessment of the Casualty Risk from Reentry Debris based on the revised NASA Debris Assessment Software (“DAS”).

The original assessment was performed by Thales Alenia Space using DAS 1.0. Iridium has now rerun that assessment using the more recent DAS 2.0.2. These results, using the same data about the Iridium NEXT system as in the initial assessment, reflects a casualty risk of 1:4400, assuming no sheltering of any kind. Of course, as Iridium has explained previously, the DAS Users Guide indicates that this part of the DAS “is intended to be a ‘first cut’ assessment tool”<sup>1</sup> that provides conservative results and requires more detailed analysis if it does not classify a mission as fully compliant on the first pass.

To conduct this more detailed analysis on Iridium NEXT, Iridium used the same assumptions about sheltering that were used by the Aerospace Corporation when it conducted the reentry risk analysis for the first-generation Iridium system in 2000 and, when it updated that analysis, in 2011. These assumptions assumed 10% of the population was unsheltered, 70% was in light shelter, and 20% was in heavy shelter. Using these assumptions for Iridium NEXT, the DAS 2.0.2 software yielded a casualty risk of 1:20,000 – only half of the risk that would be compliant with NASA guidelines. It is worth noting that these sheltering assumptions are consistent with the less-detailed assumption noted by NASA, which also assumes “approximately 80% of the world’s population is unprotected or in lightly-sheltered structures.”<sup>2</sup>

In addition, the International Association for the Advancement of Space Safety (“Space Safety”) released a publication<sup>3</sup> in 2013 that suggests a slightly different balance of sheltering assumptions. It suggests assuming that 19% of the population is unsheltered, 59% is in light shelter, and 22% is in heavy shelter. Even using this higher estimate for the percentage of the population that is unsheltered, the casualty risk for Iridium NEXT using DAS 2.0.2 is only about 1:15,000. Finally, even dramatically increasing the

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<sup>1</sup> *Debris Assessment Software User’s Guide Version 2.0*, NASA Orbital Debris Program Office.

<sup>2</sup> *Process for Limiting Orbital Debris*, NASA Technical Standard, NASA-STD-8719.14A, at 45, available at <http://www.hq.nasa.gov/office/codeq/doctree/871914.pdf>.

<sup>3</sup> Tommaso Sgobba, *Safety Design for Space Operations*, The International Association for the Advancement of Space Safety (2013), available at <http://iaass.space-safety.org/wp-content/uploads/sites/24/2012/12/Safety-Design-for-Space-Operations.pdf>.

Space Safety assumption of the unsheltered portion of the population to 37% (leaving only 41% in light shelter and 22% in heavy shelter) would still result in a compliant casualty risk of 1:10,000.

The bottom line is that the updated DAS 2.0.2 software demonstrates that with accepted sheltering assumptions (and even assuming a much larger unsheltered population), Iridium NEXT meets NASA's casualty risk guidelines.

Respectfully submitted,

A handwritten signature in black ink that reads "SCOTT HARRIS". The signature is stylized with a large, sweeping "S" and a distinct "H".

Scott Blake Harris  
*Counsel to Iridium Constellation LLC*

cc: Jose Albuquerque  
Jennifer Gilsenan  
Karl Kensinger  
Kerry Murray  
Kathryn Medley  
Clay DeCell